

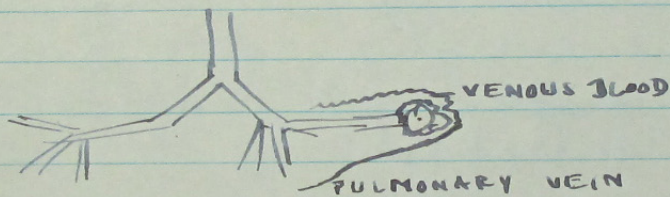
## Respiration

Internal - kinds  
External  
Inspiration } respiration.  
Expiration }

Air enters body through nose & mouth.  
" warmed & moistened in nose, by  
mucous membrane.

Lungs - lobes 2-3, 6-2.

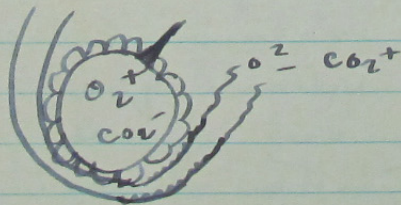
Trachea - bronchi - bronchioles - anastomosis



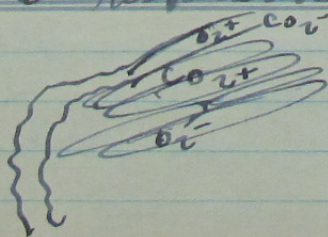
Lungs - little air sacs.

External respiration.

- anastomosis surrounded by blood vessels.



Internal respiration - in tissues of the body





Tonsils - removed when diseased.

- enlarged, sore throat.
- hard to breathe.

Focal - not easily discovered disease.

Adenoids - back of nose.

- hard of hearing - dull.

Tull capacity of lungs - vital capacity.

- 5 qts. tidal air - every breath.
- 1 qt.

complemental air - fill to excess  
- 1 1/2 qt. (extra)

supplemental air - deflated out.

3 - are vital capacity.

air left - residual air - can't be  
breathed out.

Voice - vocal chords vibrate.

- cavities of mouth, nose, larynx,  
trachea, sinuses etc. affect voice.

Larynx - lined with mucous membrane.

- higher - the higher note.

Sound - pitch - tightness & frequency of vibration  
quality - resonating chambers.

loudness - amt. of air forced out.

- nostrils at bottom of mouth.

Nasal septa lined soft mucous  
membrane - air warmed & moistened  
in these septa. Olfactory cells determine  
smell sense - nerve fibre - large nerve -  
Olfactory nerve.



## Respiration

- Respiration - supplies  $O_2$  to tissues.
  - removes  $CO_2$  & water - excretion.
- $O_2$  - interchange of gases between the blood & the body cells. - internal resp.
  - interchange between blood & lungs.
  - external resp.

Nutritive, circulatory, respiratory systems closely related.

Vital combustion - depends on fuel supplied by foodstuffs.

- requires oxygen supplied from the lungs.

Cells get materials from blood & lymph.

● Heart - important part of circulation.

Respiration depends on

- 1) Breathing - depends on rate of internal respiration.

And internal breathing depends on the activity of the cells.

(oxidation of fuel & liberation of energy)

- 2) circulation

## Mechanism of Respiration

Lungs - spongy connective tissues full of air sacs, containing capillaries.

- blood passes through, loses its  $CO_2$  & gains  $O_2$  by diffusion.

$O_2$  - blood to lymph to tissues.

$CO_2$  - lymph to blood.

$O_2$  breathed in depends on  $CO_2$  produced.



Excess acid neutralized by alkaline substances from food.

Normal alkalinity maintained by activity of kidneys.

Blood through tissues becomes acidic.

" " lungs " alkalinity.  
Breathing regulated by respiratory centre in medulla.

Breathing increases when blood too acid.

" decreases " " " alkaline.

Altitude - volume of  $O_2$  diminishes as altitude increases.

Anaemia - shortage of  $O_2$  - causes nausea, depression, apathy, muscular weakness.

- high altitudes - breathing quicker, lack of  $O_2$  - increase of  $CO_2$ .

- absorption of  $O_2$  to increase of red blood corpuscles increased. also in hemoglobin.

Structure of lungs.

Trachea - 1" tube, lined with cartilage.

- lined-ciliated mucous membrane.

Lungs - composed of acini, end in air tubes or bronchioles.

- acini divided into alveoli.

- groups of bronchioles form a bronchus.

- this mass a lobule.

- bronchi

alveoli - elastic tissue - cap. very thin.  
exchange of gases takes place between



● Between blood in these & air in alveoli.

### Chest cavity -

- enclosed by spinal column, ribs, sternum, diaphragm.
- collapse prevented by lungs filling & being enclosed in thoracic cavity.
- lungs enclosed in pleura - membranous tissue.
- inflammation of pleura causes pleurisy.

Dry pleurisy - surfaces of pleura become rough.

Empyema - fluid formed between pleura, lung squeezed away from chest.

● Pneumo-thorax - one lung collapsed.

Breathing - mechanical.

2 phases -

Inspiration - ribs rise  
- thoracic cavity increased.

Relaxation - pressure increased.

Tidal air - air exchanged in breath.

Vital capacity - deepest inspiration.

Rate - 12-20 times a minute

- in exertion rate & volume increase.
- in exercise tidal air increased.

Impulses for breathing arise from the respiratory system in the medulla.

● It maintains uniform alkalinity of the blood.

It maintains uniform breathing rhythm.  
Vagus nerves.



Protection - of lungs by upper air passages warming & saturating & removing particles from the air.

Coughing - pur respiratory passage of irritation.

- sensations arise - go to nerve cells which make the respiratory muscles work.

Sneezing - same as cough except passage to nose is open & air goes through nose & mouth.

Ricinus - contraction of diaphragm & closing of glottis.

Caused by pressure on retained food in stomach.

Sinus - cavities in bone of head & cheek.

1) frontal sinus.

2) maxillary sinus.

- connected with nose by minute passage.

Sinoritis - passages closed by swelling & they retain pus caused by careless treatment of colds.

Silicosis - a disease caused by dust.

Inflammations of respiratory tract arise from 2 causes.

1) bacterial infections.

2) irritation from physical & chemical agents.

Colds - infectious disease.

- bacteria in mouth & upper respiratory passage.



● Influenza - pandemic attacks.

- 1) respiratory system.
- 2) digestive tract.
- 3) brain & nervous system.

Air - bad ventilation from

- 1) high temperature.
- 2) excessive humidity.
- 3) lack of air movement.

Obstructions in tract

1) thickening of nasal mucous membranes.

2) deflected nasal septum.

3) polypoid formation

- growth from mucous membrane.

4) Spurs - extend from septum into nasal passage.

Causes - nasal voice

susceptibility to colds.

sinus infections.

Tonsils - behind nose & pharynx are

1) adenoids

2) facial tonsils.

3) lingual "

Tonsils - protect & destroy incoming bacteria.

Tonsillitis - infected tonsils.

- should be removed when.

1) sore throats.

2) quinsy.

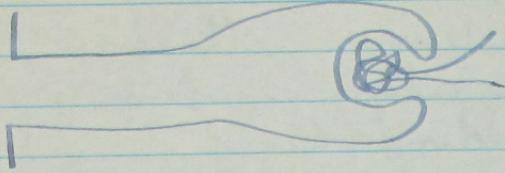
3) ear infections.

4) heart disease & rheumatism.

Tuberculosis - overtiredness.

- unpasteurized milk.





Impurities filtered by the tufts.  
To each tuft - one artery + one vein.  
Malpighian capsule surrounds the tuft (glomerulus) + it serves as a filter for waste products. From these capsule sends impurities to convoluted tubules - which wind in + out + eventually make up the urine.

- 4,000,000 capsules in kidney.
- 20 gal. a day secreted.
- high blood pressure increases amt. urine discharged.
- blood in urine means breaking down of kidney tissue of "malpighian body".
- while urine passes through the tubules, blood absorbs mineral substances in the urine.
- lengthy tubules.
- too many proteins in body then filtered out indication of broken down tissue.



## Excretion

### Accessory organs -

- liver - prepares certain wastes.
- skin -  $\text{CO}_2$ , water, (urea).

### Organs - kidneys

- bean-shaped glands
- lumbar region, either side of column
- ureters lead to bladder - urethra away

### Pelvis - empty tubes & convoluted tubules.

### Tubules - rise in renal tufts (glomeruli)

- urea distracted by osmosis & diffusion
- filtrate waste.

### Kidneys - activity controlled by amount of blood flowing through them.

- urine produced - 24 hr. 3-4 pts.
- water excreted by lungs & skin - 2 qts.

### Muscular exercise -

- increases work of kidneys.
- increases heat & cooling of body.
- produces sugar in urine.
- sometimes proteinis.
- cooling suddenly bad for kidneys.
- causes congestion & inflammation.

### Toad - too much bad.

- too much protein injurious.

### Alcohol - too much causes deterioration.

### Auto-toxication - deterioration from toxins.

- heart, arteries, kidneys.

### Intake - from intestinal tract,

alcohol

bacteria from teeth & tonsils



Kidneys - affected by -

- 1) excess of work.  
food, water, muscular exercise
- 2) inflammation - due to chilling.
- 3) poisons absorbed.  
- from substances ingested  
- products liberated.

## Skin

Epidermis - ~~dermis~~ forms keratin.

- pressure & friction thickens it.

Dermis - loose connective tissue.

- sends out papillae into epidermis above & tissue below.
- contains fat.

- nerve endings in papillae & epidermis

Glands - sebaceous (oil) - moistens (sebum).

- secrete oil around hair follicles.

Inflammation - produces boils & furuncles.  
(carbuncles)

Sweat glands - deep. temp. & exercise.

- coiled tubules ending in duct.
- surrounded by capillaries.
- hairs attached to muscle fibres.

## Functions of skin

- 1) Epidermis - protects - bacteria & injury.  
- protection of pigment.
- 2) Regulates body heat.  
- perspiration & vasomotor nerves.
- 3) Organ of sensation.  
- nerve endings.





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